

SUBJECT TEACHING GUIDE

G1924 - Principles of Immunology

Degree in Biomedical Sciences

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Biomedical Sciences			Type and Year	Compulsory. Year 2
Faculty	Faculty of Medicine				
Discipline	IMMUNOLOGY				
Course unit title and code	G1924 - Principles of Immunology				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR
Name of lecturer	RAMON MERINO PEREZ
E-mail	ramon.merino@unican.es
Office	Facultad de Medicina. Planta: + 1. SALA DE REUNIONES (1089)
Other lecturers	MARCOS LOPEZ HOYOS ESTHER TAMAYO REVUELTA PAULA PEREZ ADRIAN CAROLINA CASTRO HERNANDEZ LUIS GIL DE GOMEZ SESMA

3.1 LEARNING OUTCOMES

- Apply the basic immunological concepts to the field of biomedical sciences.
- Identify the mechanisms used by the immune system to recognize antigens and other danger signals in the microenvironment.
- Distinguish the cellular and molecular mechanisms involved in innate and adaptive immune responses.
- List the molecules involved in the activation and regulation of the immune response.
- Identify the relationship between the immune system and the microbiota.
- List the patterns of immune response to the different types of pathogens .
- Apply the fundamentals of the immune system to the rational and industrial design of vaccines.
- Correctly use and manage information sources in Immunology.
- Correctly apply laboratory techniques to study the immune response.
- Identify the principles of the generation and clinical use of monoclonal antibodies and other types of biological drugs and their application to the treatment of diseases

4. OBJECTIVES

- Describe the general functions of the immune system
- Study the innate immune response
- Study the structure and functions of immunoglobulins or antibodies
- Know the receptors involved in leukocyte activation.
- Describe the cells that participate in the acquired immune response: T and B lymphocytes and the major histocompatibility system
- Describe how the activation of the immunocompetent cells occurs
- Know the bases of the control of cell migration in the immune response
- Characterize the immune response against microorganisms
- Analyze the regulation of the immune system
- Know the peculiarities of the R.I. on the skin and mucous membranes.
- Know the bases of vaccination.

6. SUBJECT PROGRAM

CONTENTS

1	<p>Theoretical program (38 hours).</p> <p>Unit 1. Introduction: General scheme of the immune response (1 hour).</p> <p>Unit 2. Functional organization of the IR: The innate IR and the acquired IR (2 hours).</p> <p>Unit 3. Immunoglobulins and antigen-antibody binding (1 hour)</p> <p>Unit 4: Cellular sensors: BCR, TCR and PRRs (2 hours)</p> <p>Unit 5. Defensins, antimicrobial peptides and complement system (3 hours).</p> <p>Unit 6. Phagocytosis and phagocytes (2 hours).</p> <p>Unit 7. Cytotoxicity, innate cytotoxic cells and ILCs (2 hours).</p> <p>Unit 8. B lymphocytes and gene rearrangement of immunoglobulins (3 hours).</p> <p>Unit 9. The major histocompatibility system (2 hours)</p> <p>Unit 10. T-helper and T-cytotoxic lymphocytes. Tgd lymphocytes (2 hours).</p> <p>Unit 11. Activation of the IR. The immunological synapse. Cytokines (4 hours).</p> <p>Unit 12. Cell mobility in the immunological system: Chemokines and cell adhesion molecules (3 hours).</p> <p>Unit 13. Immune tolerance and regulation of IR (3 hours).</p> <p>Unit 14. IR against viruses, bacteria, fungi, protozoa and helminths (2 hours).</p> <p>Unit 15. Past, present and future of vaccines (2 hours).</p> <p>Unit 16. IR in mucosal membranes, skin and pregnancy (2 hours).</p> <p>Unit 17. Metabolism, microbiota and local tissue factors in I.R. (2 hours)</p> <p>PRACTICES (22 hours):</p> <p>Classroom Seminar. Usefulness of antibodies in Biomedicine (2 hours).</p> <p>Practice 1. ELISA (4 hours).</p> <p>Practice 2. Study of autoantibodies by IIF (4 hours)</p> <p>Practice 3. Isolation and study of mouse lymphocytes by flow-cytometry (4 hours).</p> <p>Practice 4. Isolation and study of human lymphocytes by flow-cytometry (4 hours).</p> <p>Practice 5. Mixed lymphocyte culture (4 hours)</p>
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7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Partial exam	Written exam	No	Yes	30,00
Final exam	Written exam	No	Yes	30,00
Classroom practice	Written exam	No	Yes	30,00
Laboratory practices (5)	Work	No	No	10,00
TOTAL				100,00
Observations				
<p>The students will take two exams on the dates listed in the academic year calendar.</p> <p>Each test has a maximum score of 4 points over the final mark. To pass the course it is required to get a minimum of 2 points in each of the regular tests and a total of 5 points. If a student gets less than 2 points in a regular test, then the student will need to take an exam in the extraordinary call. Marks of passed regular exams will be held during the academic year.</p> <p>Regular and extraordinary exams will include different kind of questions: multiple-choice, true/false, filling the gap, short answer questions, together with questions in which students will have to write in detail about a particular content of the subject. The professor in charge of each section will describe the exam structure. The structure of the extraordinary exam might be different from regular exams, although always including the same kind of questions described above. The professor in charge of each section will describe the exam structure.</p> <p>The classroom practice will consist of a work assigned by the teacher, on the clinical use of a therapeutic monoclonal antibody, which the students will incorporate into a practice notebook. They will be graded up to a maximum of 5% of the total grade for the course.</p> <p>Laboratory practices: The knowledge acquired in the 5 laboratory practices will be evaluated. The maximum grade may be 15% of the total grade for the course (3% for each practice). During each practice, students must complete a series of exercises and questions reflected in the practice notebook that will be used for evaluation.</p> <p>Attendance and participation in practical classroom exercises and laboratory practices are compulsory. Failure to attend to practical classes will need to be officially justified. Third unjustified lack of attendance will induce the failure in the activity and in the subject. Students from previous academic years will not need to attend laboratory and bioinformatics classes. Under any circumstances in which student might be unable to attend practical classroom exercises, practical laboratory classes or bioinformatics practical exercises, it is highly recommended student should contact in advance the head of the subject.</p> <p>Final score: To pass the course, the total sum of marks obtained in the different tests must be equal to or greater than 50% of the maximum possible mark. Whether marks in any partial exam is less than 50% of the maximum of that partial exam, and regardless of the total numerical sum of the grades, it will be considered that the student has not passed the subject, so they must recover in the extraordinary call the partial with a grade lower than 50%. Students with a total sum of grades less than 50% in the ordinary call may recover the partial failures in the extraordinary call.</p>				
Observations for part-time students				
Part-time students must attend all compulsory practical exercises and they must go through the evaluation process as the rest of the students				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
<ul style="list-style-type: none"> * Regueiro J, y colaboradores: "Inmunología. Biología y Patología del Sistema Inmune". Editorial Panamericana. * Owen, Punt, Strantford, "Kuby Immunology", Ed. McGraw Hill. * Parham P: "The Immune System", Garland Science, * Abbas AK, Lichtman AHH, Pillai S, "Inmunología Celular y Molecular", Ed. Elsevier,